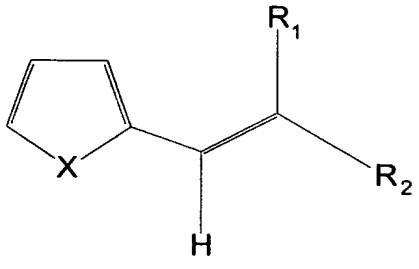
CLAIMS

1. A controlled radical grafting process of a polyolefin, derived from monomeric units comprising α-olefins, comprising the reaction of the polyolefin and at least one radical reaction initiator with a grafting system which comprises at least one grafting compound having an electron donator heterocyclic aromatic ring conjugated to at least one $-HC=CR_1R_2$ group in which at least one of R_1 and R_2 is an electron acceptor functional group.

2. A process according to claim 1, in which R_1 and R_2 are chosen independently of one another from -H, -COOR, -COOH, -COR, -COH, -CN, $-CONH_2$, $-COO(CH_2)_nCF_3$ and $-COO(CH_2)_nCN$, where R is a linear or branched aliphatic or aromatic linear alkyl group and n is a whole number lying between 1 and 20, with the proviso that R_1 and R_2 are not both -H.

3. A process according to claim 1, in which the said heterocyclic ring is a possibly substituted furanic thiofenic, or pyrrolic ring.

4. A process according to any preceding claim, in which the said grafting system comprises a compound of formula:



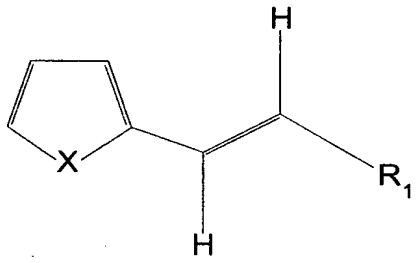
where X is chosen from O, S and N, and R_1 and R_2 are the same or different functional groups chosen from -COOR, -COOH,

-COR, -COH, -CN, $-CONH_2$, $-COO(CH_2)_nCF_3$ and $-COO(CH_2)_nCN$ where R is an aliphatic or aromatic linear or branched alkyl group and n is a whole number lying between 1 and 20.

5. A process according to claim 4, in which the said groups R_1 and R_2 are the same of the type -COOR, where R is $-CH_2CH_3$.

6. A process according to claim 4, in which the said group R_1 is -CN and the group R_2 is -COOR, where R is $-CH_2CH_3$.

7. A process according to any preceding claim, in which the said grafting system comprises a compound of formula:



where X is chosen from O, S and N , and R_1 is a functional group chosen from -COOR, za-COOH, -COR, -COH, -CN, $-CONH_2$, $-COO(CH_2)_nCF_3$ and $-COO(CH_2)_nCN$ where R is a linear or branched aliphatic or aromatic linear alkyl group and n is a whole number lying between 1 and 20.

8. A process according to claim 7, in which the said group R_1 is -COOR, where R is $-CH_2CH_2CH_2CH_3$.

9. A process according to any preceding claim, in which the said grafting system further includes at least one unsaturated compound which has át least one group which is able to react with an aminic and/or carboxylic and/or hydroxylic functionality.

10. A process according to claim 9, in which the said unsaturated compound is chosen from acrylic and methacrylic compounds, maleic anhydride, derivatives ester of maleic anhydride, and their mixtures.

11. A process according to any preceding claim, in which the said polyolefin is chosen from the group consisting of homopolymers and copolymers of α-olefins and their mixtures.

12. A process according to any preceding claim, in which the said radical initiator has a half life lying between 10 and 200 seconds in the temperature range lying between 120 and 240ºC.

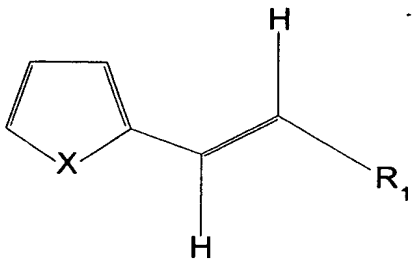
13. A process according to any preceding claim, in which the said radical initiator is an organic peroxide such as a dialkyl peroxide, a diacil peroxide, a peroxy ester or a peroxychetal.

14. A process according to any preceding claim in which the said radical initiator is chosen from the group consisting of dicumil peroxide, ditertbutyl peroxypropylbenzene, 2,5 dimethyl 2,5 ditertbutyl peroxy-hexane, 3,6,9-triethyl-3,6,9 trimethyl-1,4,7 - triperoxynonan and their mixtures.

15. A process according to any preceding claim, in which 0.5 to 30% by weight of the said grafting system and from 0.05 to 5 parts by weight of the said radical initiator are mixed with 100 parts by weight of the said polyolefin.

16. A process according to claim 1, in which 100 parts by weight of the said polyolefin are mixed with 1 - 25 parts by weight of an unsaturated compound chosen from acrylic and

methacrylic compounds, maleic anhydride, ester derivatives of maleic anhydride and their mixtures, 0.05 - 5 parts by weight of a radical initiator of organic peroxide type and 0.1 - 5 parts by weight of a compound of formula



where X can be chosen from O, S and N, and R_1 is a functional group chosen from COOR, -COOH, -COR, -COH, -CN, $-CONH_2$, $-COO(CH_2)_nCF_3$ and $-COO(CH_2)_nCN$, where R is a linear or branched aliphatic or aromatic alkyl group and n is a whole number lying between 1 and 20.

17. A process according to claim 15 or claim 16, in which 100 parts by weight of the said polyolefin are further mixed with 0.01-1 parts by weight of a radical reaction inhibitor.

18. A process according to claim 17, in which the said radical reaction inhibitor is chosen from the group consisting of 3,5-di-tert-butyl-4 hydroxytoluene, Irganox 1010 and Irganox 1076.

19. A process according to any preceding claim, performed in a mixer provided with a rotor.

20. A process according to claim 19, in which the said grafting system is introduced into the mixer after the polyolefin.

21. A process according to claim 20, in which the said grafting system is introduced into the mixer once the torque transmitted by the rotor member is stabilised.

22. A process according to claims from 19 to 21, in which the said radical initiator is introduced subsequently to the grafting system.

23. A process according to any of claims from 19 to 22, in which the rotor member turns with an angular velocity of 20 - 70 rpm.

24. A process according to any of claims from 19 to 23, in which the residence time of the reagents in the mixer lies between 5 and 30 minutes.

25. A process according to any of claims from 19 to 24 , in which the temperature of the reagents lies between 120 and 230°C.

26. A process according to any of claims from 19 to 25, performed continuously by means of a twin screw extruder.